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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,203	06/09/2005	Thomas Juestel	DE 020311	1821

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EXAMINER	
WIESE, NOAH S	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
02/21/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,203	JUESTEL ET AL.	
	Examiner	Art Unit	
	NOAH S. WIESE	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *4 and 6* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7-10 and 12-18* is/are rejected.

7)☐ Claim(s) *10,11 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/09/2005; 04/07/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

1. The claims 1-18 are pending and presented for the examination. Claims 4 and 6 are withdrawn. Claims 1-3, 5, and 7-18 are entered and examined on merits.

Election/Restriction

2. Acknowledgement is made of applicant's election with traverse of Group I, claims 1-7 and the species claims 5 and 7. In view of applicant's arguments and amendments filed on 01/04/2008, the restriction requirement between groups I and II is hereby withdrawn, and both groups will be examined on merits. The election requirement between the two species of claims 4-5 and 6-7 is maintained. As such, claims 4 and 6 remain withdrawn, while claims 1-3, 5, and 7-18 are examined on merits.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/IB03/05727.

Information Disclosure Statement (IDS)

4. The information disclosure statements (IDS) were submitted on 06/09/2005 and 04/07/2006. The submissions are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner. Please refer to applicant's copy of the 1449 herewith.

Claim Objections

5. Claim10 is objected to because of the following informalities: The claim does not give a range of possible values for the x variable. Therefore, it is not possible to determine the scope of the claimed phosphor formula. For purposes of examination on merits, the claim has been treated as having an x-value range of $0 \leq x \leq 1$. Appropriate correction is required.

6. Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 14 does not further limit the phosphor composition of claim 13. Instead, the claim gives further elements from which EA and B can be selected. This broadens the claim. Proper correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-2, 5, 8-10, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (US 2003/0094893).

Regarding **claim 1**, Ellens et al teaches an illumination system comprising a phosphor composition with the formula $Sr_2Si_4AlON_7:Eu^{2+}$ (see Table 4). While this formula varies very slightly from the formula of claim 1, one of ordinary skill in the art would recognize from the teachings of Ellens et al that the inventors had possession of a phosphor wherein a small amount of Sr was replaced with the Eu ion (i.e. doped). This practice of doping by replacing small amounts of the Sr element was well known in the art, and the fact that Ellens et al does not write the phosphor formula in the form Sr_{2-x} ... Eu_x would not dissuade one of ordinary skill from understanding the method of doping. Therefore, it is clear that Ellens et al teaches an illumination system comprising a phosphor with a formula that anticipates that of claim 1.

Regarding **claim 2**, Ellens et al teaches an embodiment of the illumination system that contains a phosphor according to Ellens' invention, along with a blue and green phosphor (see claim 10). It would be obvious to one of ordinary skill to use the $Sr_2Si_4AlON_7:Eu^{2+}$ phosphor as the red phosphor because this is one of the inventive phosphors and because its emitted light is in the red region of visible light.

Regarding **claim 5**, Ellens et al teaches that the source of radiation for the illumination unit is preferably a nitride semiconductor with a formula that meets the limitations of claim 5 (see paragraphs 0073 and 0084).

Regarding **claim 8**, as discussed above, Ellens et al teaches a phosphor with a formula that is substantially the same as that of claim 8 (see Table 4).

Regarding **claim 9**, the formula taught by Ellens et al can also meet the limitations of the phosphor of the claim. The element EA can be Sr, and additionally x can be equal to zero. Also, B can be Al and b can be equal to 0. In these cases, the phosphor formula taught by Ellens et al would read on the formula of claim 9, rendering the claim patentably indistinct over the prior art of record.

Regarding **claim 10**, in similar fashion to claim 9 above, the phosphor formula taught by Ellens et al can read on the formula of claim 10 if x and y are equal to zero.

Regarding **claim 14**, the claim broadens claim 13 to include all of the possible elements of claim 1. Therefore, the illumination unit comprising the phosphor formula taught by Ellens et al also renders patentably indistinct the illumination system comprising the phosphor of claim 14

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (US 2003/0094893) in view of Mueller et al (WO 0124229).

Regarding **claim 3**, Ellens et al differs from the claim because Ellens et al does not teach that the green phosphor used is one of the types listed in the claim. However, the use of these types of phosphors in conjunction with a red phosphor in an illumination system was known in the art at the time of the invention, and thus it would

have been obvious to one skilled in the art to use the inventive phosphor of Ellens along with a green phosphor of the types claimed in claim 3.

Mueller et al teaches an illumination system (a lamp) that comprises a mix of red and green phosphors. The green phosphor in the lamp has a formula of $SrGa_2S_4$:Ce (see claims 1 and 6). The teachings of Mueller et al show that it was known that phosphors of the type listed in claim 3 were known in the art to be useful as green phosphors used along with red phosphors in illumination systems. Therefore, the use of such a phosphor in the illumination unit taught by Ellens et al would simply be a matter of substituting an equivalent green phosphor in order to get expected, equivalent results. Since the teachings of Mueller et al show these equivalent results to be the case, no detrimental results would be expected from the modification of Ellens et al in view of Mueller et al, and claim 3 is obvious and not patentably distinct over the prior art of record.

11. Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (US 2003/0094893) in view of Hase et al (US 5951915).

Regarding **claim 7**, the claim differs from Ellens et al because Ellens et al does not teach or suggest that the illumination unit is in the form of a traffic sign. However, the use of phosphor materials in traffic signs is well known in the art, and thus using the illumination unit taught by Ellens et al in this form would have been obvious to one of ordinary skill in the art. Hase et al teaches that the phosphor material taught in the patent can be used in road signs (see column 5, lines 43-50). Road signs are synonymous with traffic signs. One of ordinary skill in the art would have been

motivated to use the Ellens phosphors in traffic signs because of the obvious utility that these signs provide. One would have expected reasonable success in this function because the teachings of Hase et al show that the use of phosphors in traffic signs was known in the art to be successful. Therefore, claim 7 is obvious and not patentably distinct over the prior art of record.

Regarding **claim 12**, Ellens et al differs from the claim because Ellens et al does not teach or suggest that the silicon component can be replaced by germanium. However, it is known in many arts, including that of oxy-nitride phosphors, that silicon and germanium are very similar elements that can perform equivalent functions and be used interchangeably.

Hase et al teaches a phosphor material that can have many different embodiments, all of which contain Sr and O (indicating their similarity to the Ellens phosphor). As can be seen from the Abstract and Figure 1, the silicon and germanium components can be used interchangeable in the phosphor compositions, indicating their equivalent functions. Therefore, the use of germanium in place of silicon in the phosphors taught by Ellens et al would simply be a matter of using one phosphor in place of another, equivalent phosphor. Claim 12 is therefore obvious and not patentably distinct over the prior art of record.

12. Claims 13, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (US 2003/0094893) in view of Yamada et al (US 6139774).

Regarding **claim 13**, Ellens et al teaches that Mg can be used as the "M" element in the phosphors of the invention (see paragraph 0060). Although Mg is not specifically taught for the phosphor with the structure $Sr_2Si_4AlON_7:Eu^{2+}$, it would have been obvious, given the teachings of the patent, that Sr could be replace with Mg in this formula. This is because Mg and Sr are taught to be equivalent in the similar phosphor formulas taught in the patent. Ellens et al differs from the claim because Ellens et al does not teach that Al (element B) can be replaced by Ga or In. However, it was known in the art at the time the invention was filed that Al, Ga, and In can all perform equivalent functions in phosphor materials.

Yamada et al teaches oxide phosphor materials that contain Ca, Sr, or Ba as a cation. The patent teaches that Al, Ga, or In can each be included in the material interchangeably (see Abstract). Because Yamada et al teaches analogous types of phosphors to Ellens et al, and because it is clear from Yamada et al that Al, Ga, and In all perform equivalent functions in these types of phosphors, one of ordinary skill in the art would understand that using Ga or In in place of Al in the Ellens phosphors would simply be a matter of using an equivalent element in order to achieve expected, equivalent results. Therefore, the claim 13 is obvious and not patentably distinct over the prior art of record.

Regarding **claim 15**, as discussed above, Ellens et al teaches an illumination unit (system) that comprises a red phosphor according to the invention and a green phosphor.

Regarding **claim 17**, as discussed above, Ellens et al teaches that the radiation source is a nitride semiconductor represented by a formula that is equivalent to that of claim 17.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (US 2003/0094893) in view of Yamada et al (US 6139774) and Hase et al (US 5951915).

Regarding **claim 18**, the claim differs from Ellens et al in view of Yamada et al because these patents do not teaches that the illumination system is in the form of a traffic sign. However, as discussed above, Hase et al teaches this use for phosphors, and motivation to use the phosphors of Ellens et al in view of Yamada et al in this manner would exist. Therefore, it would have been obvious to one of ordinary skill in the art to create a traffic sign using the phosphors of Ellens in view of Yamada, and claim 18 is not patentably distinct over the prior art of record.

14. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ellens et al (US 2003/0094893) in view of Yamada et al (US 6139774) and Mueller et al (WO 0124229).

Regarding **claim 16**, the claim differs from Ellens et al in view of Yamada et al because neither document teaches that the green phosphor used in conjunction with the red phosphor in the illumination unit is one of those listed in claim 16. However, as discussed above, these types of phosphors are known in the art to be useful as green phosphors used with red phosphors. The modification of Ellens et al in view of Mueller

et al is discussed above, and this modification would also hold for Ellens et al in view of Yamada et al. Therefore, all of the elements of claim 16 were known in the art and would be obvious to use together, and the claim is not patentably distinct over the prior art of record.

Allowable Subject Matter

15. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The cited prior art does not teach or suggest a phosphor composition with the structure or formula given by claim 11 (i.e., where "a" is equal to 2). Therefore, the claimed subject matter is allowable but objected to.

Conclusion

16. No claim is allowed. Claims 1-3, 5, 7-10, and 12-18 are rejected. Claim 11 is objected as allowable subject matter depending on rejected claims.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Noah S. Wiese whose telephone number is 571-270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Noah Wiese
February 12th, 2008
AU 1793

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793